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German Economic Review

Provided in Cooperation with:
WZB Berlin Social Science Center

Suggested Citation: Kübler, Dorothea; Schmid, Julia; Stüber, Robert (2019) : Take Your Time to Grow: A Field Experiment on the Hiring of Youths, German Economic Review, ISSN 1468-0475, Wiley, Oxford, Vol. 20, Iss. 4, pp. e706-e729, http://dx.doi.org/10.1111/geer.12188

German Economic Review 20(4): e706–e729 doi: 10.1111/geer.12188

Take Your Time to Grow: A Field Experiment on the Hiring of Youths

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Abstract. *We investigate the effect of spells of no formal employment of young Germans on their chances of entering the labor market through an apprenticeship. We also study whether the potential negative effects of such spells can be mitigated by publicly provided training measures. In a field experiment, the fictitious applications of three young women were sent to firms advertising apprenticeships for the position of office manager. One application was from a fresh school-leaver and two from applicants who had been out of school for two years, where one of them had participated in a training measure. We find that applicants who have been out of school for two years and have participated in the training are more successful than older applicants without additional training. We do not find a significant difference between older applicants with or without training and fresh school leavers. Our findings show that training measures increase the attractiveness of applicants and that the potential stigma of spells of no formal employment after school are compensated by informal work experience or age or a combination of both.*

JEL classification: *I28, J64, C93.*

Keywords: Field experiment; apprenticeship; hiring decisions; informal and formal employment; training.

1. INTRODUCTION

Entering the labor market is an important stage in people's lives, since the first job can have a lasting effect on the entire career. Therefore, young adults and youths often feel under pressure to avoid gaps of unemployment after finishing school. But how harmful are such gaps really? Do early career mishaps affect future employment? Do employers interpret gaps after finishing school as a bad sign of an applicant's abilities? And can job searchers make up for the gaps with the help of other activities, such as additional training? The answers to these questions are important for labor market policies, and they also shed light on the relevance of human capital effects, signaling, employer herding and stigma at this early stage of people's careers.

Addressing the problems of youths without a formal employment is high on the political agenda in many countries. But it is not well understood what causes the difficulties of some youths to find such employment. While it is a common research practice to use data on job placements, this placement is the joint result of the applicants' preferences, their search behavior as well as other unobserved characteristics on the one hand, and employer preferences and hiring behavior on the other. Therefore, the finding that a spell of no formal employment after school goes along with a low employment probability is not necessarily due to employers evaluating those applicants less favorably. It could also be caused by characteristics of the applicants that are observable to the employer but not to the researcher, such as the quality of the application, or differences in search behavior.

This study focuses on the role of employers. However, one difficulty with asking them directly about their recruitment criteria is that it may induce socially desirable answers.[1] We therefore conducted a field experiment to study employer behavior and to identify what the real pressures are on adolescents entering the labor market.

The field experiment was conducted in the main entry-level labor market for youths in Germany, namely the market for apprenticeships. The apprenticeship system is an important feature of the German labor market, since more than 60% of all school leavers start an apprenticeship every year (BMBF, 2012). Most other school leavers enter university, and only a small fraction starts neither an apprenticeship nor tertiary education. The majority of apprentices move on to regular employment at the firm that trained them (BIBB, 2012). Therefore, hiring procedures for apprentices are similar to those for other employees in Germany.

Our first question is whether applicants who have been out of school for two years without starting an apprenticeship are evaluated less favorably by employers than recent school leavers.[2] Our second research question addresses whether applicants who do not start an apprenticeship after finishing school can improve their chances of employment by getting additional training. In particular, we study whether participating in a voluntary one-year prevocational training program helps these youths or whether it carries a stigma.[3]

Our experimental design is as follows. We compare three applicants, namely two applicants who have been out of school for two years and a fresh school-

1. This is of particular concern due to recent campaigns in Germany to help applicants who do not apply as fresh school leavers to find an apprenticeship position. Youths searching for an apprenticeship position who have been out of school for more than a year ('Altbewerber') have been the focus of a number of policy measures. A subsidy for firms employing such applicants with a lower secondary degree was in place from 2008 to 2010.
2. Since the market is competitive, many applicants do not find an apprenticeship position. At the same time, many apprenticeship positions remain unfilled, mainly due to regional and occupational mismatch as well as the perception that the quality of the applicants is too low (German Federal Employment Agency, 2017).
3. Youths without an apprenticeship position can enter the so-called 'transition system' consisting of various publicly funded one-year training programs that do not lead to a recognized vocational qualification. Participation in such a training is voluntary in some German states (including Berlin where the experiment was conducted), but not in others. Every year around 300,000 adolescents participate in the system (see Authoring Group Educational Reporting, 2012, p. 11), which costs the public more than four billion Euros per year (Klemm, 2012). Baethge *et al.* (2007) provide a description of the various measures of the transition system, and the economic aspects of the system are discussed by Fitzenberger *et al.* (2015). Kohlrausch (2012) elaborates on its potential stigmatizing effects.

leaver. Among those who finished school two years ago, one has participated in a one-year full-time prevocational training and the other has not. Both of the older applicants are working in an informal job when they apply for apprenticeships. This design choice allows us to have some control over the employers' beliefs about the applicants' activities since leaving school. Note, however, that we cannot distinguish between the effect of being older and of having some work experience in an informal job. Moreover, we study only female applicants.[4]

Furthermore, we run the experiment in two waves and vary the average school grade of our applicants between the waves. In the first wave of the experiment, all three applicants had good grades while in the second wave, their grades were only satisfactory. In this way, we attempt to assess whether any effects of spells of no formal employment hold for different grade levels. As we only vary the average grades between waves and do not randomize grades within one wave, the effect of the grade might also capture other factors that change over time and that influence the effect of spells of no formal employment on invitation rates.[5]

We find that across both waves older applicants with training are invited most often, followed by fresh school leavers and then by older applicants without training. However, only the invitation rates of older applicants with and without training are significantly different. Thus, we find that prevocational training makes older applicants who are two years out of school more attractive compared to older applicants without such training. In particular, the trained applicants of wave 1 with good grades are 10% more likely to receive a callback based on their written application and the trained applicants with satisfactory grades of wave 2 are even 38% more likely compared to those without the training.

There is no significant difference in invitation rates between fresh school leavers and older applicants, with or without prevocational training. While it is possible that not starting an apprenticeship right after school carries some stigma, it is compensated by a positive effect of age, by working in an informal job or a combination of both.[6] Overall, the results suggest that youths can take their time to grow before entering the labor market, especially if they participate in prevocational training measures. In institutional settings where these measures are voluntary, they possibly allow students to acquire human capital and signal self-discipline and motivation (Bedard, 2001; Spence, 1973), and they appear to be particularly useful for applicants with only satisfactory grades.

4. We did not vary the gender since this would have doubled the amount of data to be collected, either by sending out six instead of three fictitious applications to each firm or by sending out applications to more firms. We decided against this, since we did not want to overburden firms and since the number of firms looking for an apprentice in the relevant profession is limited. For the same reason, also other studies investigating unemployment duration effects have focused on one gender (Farber *et al.*, 2015; Oberholzer-Gee, 2008).
5. For instance, the economic conditions might change between the waves. It is in this respect reassuring that (i) the number of vacant apprenticeship positions per 100 young people interested in taking up an apprenticeship was almost identical in Berlin during both waves (BIBB, 2014), and (ii) the number of newly signed apprenticeship contracts for office managers also did not vary substantially in Berlin between 2011 and 2013 (BIBB, 2018). Finally, note that the effect of the grade on invitation rates clearly goes in the expected direction (see below).
6. A stigma effect is predicted by the literature on employer herding where employers learn from the negative decisions by other employers. See Gibbons and Katz (1991), Kübler and Weizsäcker (2003), Lockwood (1991), as well as Biewen and Steffes (2010).

2. RELATED LITERATURE

Duration or scarring effects (i.e., long-lasting adverse effects on pay and employment) that are due to youth unemployment have been studied by a number of contributions. Youth unemployment has been shown to be correlated with lower wages (Möller and Umkehrer, 2015 for Germany as well as Oreopoulos *et al.*, 2012 for the US, and Gregg and Tominey, 2005 for the UK) and with adult unemployment (Gregg, 2001) or both (Mroz and Savage, 2006). The evidence on the effects of informal jobs or of the underemployment of youths is mixed (Bosch and Maloney, 2010; Cruces *et al.*, 2012). In a study on the Job Corps program in the US, a training program that is somewhat comparable to the transition system in Germany, Schochet *et al.* (2008) show that participation leads to better educational outcomes, reduces criminal activities and increases earnings for several years after the program.[7]

All papers on duration effects mentioned above focus on the long-term effects of early unemployment. In contrast, our study asks whether scars can already originate within two years after leaving school by lowering the chances of finding the first formal employment. Similar to our study, Franz *et al.* (2000) consider the entire process of youths entering the labor market and also investigate the transition from school to an apprenticeship. They combine several administrative and survey datasets, but do not focus on the role of a delayed start into vocational training.

None of the studies mentioned so far uses an experimental approach. Therefore, both the employer's decisions and differences between applicants with respect to their application and search that are unobservable to the researcher could be driving the outcomes. A number of experimental studies on the effect of spells of unemployment have been conducted where fictitious applications were sent out to employers, using the design of audit studies that have first been employed in the context of discrimination (e.g., Bertrand and Mullainathan, 2004).[8] A field experiment in Switzerland by Oberholzer-Gee (2008) documents unemployment stigma for administrative assistants. In contrast to our experiment, the reasons for the stigma are not investigated, for example, by varying the occupation of the applicants while they are unemployed. Three field experiments were conducted recently in the US and in Sweden. Kroft *et al.* (2013) find for the US that the largest decline in the likelihood of receiving a callback occurs in the first eight months, and that the adverse effect is stronger the tighter the labor market. Eriksson and Rooth (2014) conducted a large study in Sweden including jobs requiring different skill levels. They observe no negative effects during the first six months of unemployment, but after nine months there are clear duration effects for jobs requiring low to intermediate skills. For high-skilled applicants and jobs, there is no such effect. They also find that long-term unemployment in the past does not matter while work experience is very important. Farber *et al.* (2015) document for female

7. The Job Corps program is a large, federally funded training program for disadvantaged youths aged 16–24, lasting an average of eight months.
8. In Germany, where employers require application packages to include certificates from school, photographs, etc., only a few such studies have been conducted, one recent example being Kaas and Manger (2012) on ethnic discrimination in the market for student internships.

clerical workers that spells of unemployment are more damaging for older applicants and that taking up a lower-level interim job is harmful.

There are two field experiments on labor market entrants that we are aware of, both of them conducted in the US. Deming *et al.* (2016) vary the college from which applicants received their degree (for-profit or public, online vs. 'brick and mortar', more vs. less selective). Closer to our experiment is the study by Nunley *et al.* (2017) which estimates the effect of underemployment of college graduates. By varying the length of the employment gap (3, 6 and 12 months) as well as the type of previous employment (requiring or not requiring a college degree) in their CVs, they find underemployment to be more harmful than unemployment. Aside from the difference between the US and the German institutional context, our study differs from their experiment in that we focus on longer gaps of two years after leaving school, and that we consider the effect of additional training measures on the likely success of applicants.

3. CONTEXT OF THE EXPERIMENT AND RESEARCH QUESTIONS

In order to design the experiment in a meaningful way, we conducted 10 expert interviews with human resource managers at large firms located in Berlin where the field experiment was later implemented. The interviews helped us to gain a good understanding of the hiring procedure of apprentices. We asked the managers about their recruitment procedures and about what kind of screening is done at which step. It turned out that recruitment procedures are similar across firms. The structure of the recruitment process that emerged from the interviews is described in the next section. Furthermore, we collected a number of written applications for apprenticeship positions from students in previous years in order to make our fictitious applications as realistic as possible.

3.1. Recruitment process

The apprenticeship positions are advertised at online job portals, on the company's website or both. The advertisements define the target population by stating the desired characteristics of applicants. From the expert interviews that we conducted, it emerged that the typical recruitment process for apprentices in large companies can be described as a sequence of steps. Only those applicants proceed to the next step who have been evaluated positively at the preceding step.

In the first step, a selection is made based on the written applications, and it is only at this step that the written application plays the dominant role. Relevant criteria are the school degree, the school grades, teachers' reports on non-cognitive skills and the overall impression of the applicant based on the CV. Those participants who passed the first step (the proportion of them varying across firms, years and professions) are invited to the second step. There, applicants take a test of German, maths as well as other subjects taught at school, sometimes also IQ tests. Third, those who pass the test are invited to interviews. The interviews serve to assess an applicant's personality, motivation, the vocational interest as well as the communication and team-working skills. After this final step, job offers are made.

The experiment focuses on the employers' choices made in the first step. Of course, we cannot know whether our applicants would have been able to pass further steps. However, the first step poses a significant hurdle for the applicants (only 30–60% of the applicants in our experiment pass it), and it is exactly at the first hurdle that the characteristics of the applicants that we vary are of primary importance. In particular, it is at the first step that the school grades and the CV play the main role for the employers' decisions. Hence, our approach allows us to gauge the relevance of information conveyed by the CV, such as spells of no formal employment, which is our variable of interest.

3.2. Research questions

We study the effects of spells of no formal employment of adolescents on their employment opportunities. In particular, we hypothesize that applicants who have been out of school for two years have a lower chance of being invited to the next step of the recruitment process based on their written application than applicants who have just finished school. Second, we test the hypothesis that applicants who participate in training measures between leaving school and the application can thereby avoid some of the negative effects of spells of no formal employment.

To investigate these issues, we create applications for 'new' applicants who are just finishing school and for 'old' applicants who have been out of school for two years without starting an apprenticeship. We distinguish between two types of old applicants, depending on their activities during their spell of no formal employment. In particular, we compare an applicant who has participated in voluntary full-time prevocational training with an applicant who has not participated in such a training.

The differentiation between the two types of old applicants allows us to investigate whether the potential negative effects of not starting an apprenticeship right after school can be compensated by participating in a training measure or whether this is counterproductive. We run our experiment in Berlin where mandatory schooling ends after grade 10. Thus, participating in the non-selective training measure is voluntary.[9]

Prevocational training programs are targeted at youths who could not find an apprenticeship position. However, the majority of youths participating in a prevocational training in Germany do not find a regular employment or an apprenticeship afterwards (see e.g., Baethge *et al.*, 2007). The reasons for this observation are not well understood. It could simply be caused by a selection effect in that students who are less attractive for employers end up taking prevocational training. However, it is also possible that prevocational training carries a stigma and therefore leads to unsuccessful applications later on. These negative stigma effects could be stronger than the potential increase in human capital. On the positive side, the prevocational training may also signal desirable traits such as motivation and self-discipline since participation is voluntary. With the

9. Some German states require 12 years of schooling, some nine and some have age limits in combination with years of schooling. In some states, the prevocational training counts as part of a higher schooling degree or school-based vocational training, see Fitzenberger and Lickleder (2015), but this is not the case in Berlin where our study was conducted.

help of the experiment, we can exclude selection effects since we have control over the applicant pool and we can thereby study the direct effect of the training measure on the responses by employers.

4. EXPERIMENTAL PROCEDURES

We sent out applications for apprenticeships of office manager (Bürokauffrau) and office clerk (Kauffrau für Bürokommunikation). Both professions are similar and for both of them employers require an intermediate secondary degree (MSA) that students receive after ten years of schooling.[10] Moreover, both professions are at an upper intermediate level among apprenticeships in terms of competencies required. Office managers and office clerks work in various industries. Also, both professions are predominantly female, and office clerk is one of the most frequent apprenticeships of women (Statistisches Bundesamt, 2013).[11] Since we do not focus on gender differences and are limited in the number of applications, we can send to each firm, all our fictitious applicants are female.

For the sample, we restricted attention to firms with 30 or more employees in Berlin that offered apprenticeship positions for office managers and office clerks in 2011/12 and in 2012/13. For ethical reasons, we chose not to burden smaller firms with the additional work of our fictitious applications.[12] Since apprentices typically live with their parents, the market for apprenticeships is local. Students applying to firms outside of their home region are rare. Since our fictitious applications contain transcripts from local schools and home addresses in Berlin, we restricted our experiment to firms in Berlin.

We conducted two waves of the experiment in consecutive years with the same three applicant types (namely fresh school leavers and older applicants with and without additional training), but with different average grades. The average grade was kept constant for all applicants within one wave. By varying the grade level between waves, we attempt to investigate whether the impact of our experimental variables is robust and independent of the grade level.[13] This addresses an important limitation of correspondence studies, pointed out by Heckman and Siegelman (1993), namely that the effect of the variable of interest at the chosen grade or productivity level may differ from the overall effect. Applications were sent out continuously from October 2011 to May 2012 and from October 2012 to May 2013. The job ads appeared in this period of seven months for positions starting in the summer of 2012 and 2013, respectively. The

10. The German school system provides three different degrees for those leaving school. The lower secondary degree after nine years (Hauptschulabschluss), the intermediate secondary degree after ten years (MSA or Realschulabschluss) and the upper secondary degree (Abitur).
11. Taking both male and female apprentices together, the two occupations are among the most commonly chosen apprenticeships: office manager was ranked fourth and office clerk 13th in Germany in 2013 (BIBB, 2013).
12. By accident, applications were sent to a few firms with less than 30 employees. We decided to keep these observations in the sample.
13. However, varying the applicants' grades between but not within waves comes at the cost that other factors besides grades may drive any differences between waves.

market conditions remained relatively stable in the two years, 2012 and 2013, but we will consider each wave separately in the main part of the analysis.

We created three applicant types that we randomly assigned to fictitious applicants to study the effect of no formal employment after school on the chances of finding an apprenticeship. First, the *New* applicant is still at school and in her last year (10th grade) at the time of the application. There are two old applicants. Both of them finished school almost two years ago and currently have an informal job. The Old_{prevoc} applicant has completed one year of prevocational training whereas the *Old* applicant did not. No further information is given about the activities of the old applicants since finishing school. Both Old_{prevoc} and *Old* applicants have an intermediate-level degree while the *New* applicants are 'most likely to receive an intermediate-level degree', according to their last school report.

The main variables characterizing the three applicants in the design of wave 1 [wave 2] are depicted in Table A1. Moroever, all three have good to satisfactory school grades with an average of 2.8 [3.2] and good evaluations of their non-cognitive skills.[14] Many youths who do not start an apprenticeship take on temporary jobs to earn some pocket money, and we therefore included this information in the CV. Both applicants are working as salespersons, one at a greengrocer's and the other at a bookstall. The two jobs are comparable in pay and prestige.[15] The jobs are non-selective and most likely convey less human capital than the prevocational training. No mention is made in the CV as to how many hours the applicants work in this job and for how much time they have been doing so.

Importantly, in Germany, employment that is not only temporary and the probability to become unemployed correlate strongly with a completed apprenticeship.[16] While it is possible that working in an informal job signals some desirable characteristics to the employer, such as self-discipline, there is evidence that working in a lower level interim job can have negative consequences on employment opportunities (Farber *et al.*, 2015; Nunley *et al.*, 2017). Note that since both older applicants work in such jobs, we can identify the effect of the training measure.

The prevocational training that our applicants participated in comprises coursework in German, English, Maths, law, business and some additional topics as well as individual coaching measures and the development of soft skills. Thus, the training is relevant for the professions of office manager and office clerk.

An application for an apprenticeship includes a letter of motivation, the CV including a photograph of the applicant and copies of the last three school

14. In the German grading system, 1 is the best (very good) and 6 the worst grade. A grade of 2 indicates a good performance, 3 is satisfactory, 4 sufficient, and 5 and 6 are fail. The grade transcripts also report on grades for non-cognitive skills such as participation in class and self-discipline that were not varied in this study. For the relative importance of cognitive and non-cognitive skills in the application process for apprenticeships see Protsch and Solga (2015).
15. The two jobs were not randomized so as to limit the complexity of the design.
16. In 2011, 16% of people between 25 and 35 years of age who had not completed an apprenticeship and were not currently enrolled in school, university or completing an apprenticeship were unemployed. For those with completed vocational training or an academic degree, the unemployment rate was only 5%. See German Federal Employment Agency (2013). This is, of course, only correlational evidence.

certificates. For each wave, we created three full application profiles with names, addresses, etc. To make them as realistic as possible, we used the applications we had collected in the field. These fictitious persons or profiles are fixed, that is, we did not randomize their characteristics. Instead, the fictitious persons were randomly assigned to the applicant types described in Table A1. Thus, for each job advertisement, we responded to, we used an independent random device to determine which fictitious applicant was a fresh school-leaver, an older applicant with and an older applicant without the training measure. We chose the fictitious profiles to be as comparable as possible. All fictitious applicants lived and attended schools in the same district of Berlin. We thereby avoided differences between profiles that are due to different socio-economic characteristics of districts. For every firm that advertised an apprenticeship position, we randomly matched the three fictitious profiles to the three applicant types (*New*, Old_{prevoc} and *Old*), and sent out applications to the firm for all three applicants. Thus, every employer received three applications from us.

For each fictitious applicant, we created an email account, a mobile phone number and a postal address.[17] Responses by firms were usually received via phone (answering machine) or email. Whenever one of our applicants received an invitation to take the test, we recorded this and immediately declined the offer in order to make place for a real applicant.

5. RESULTS

5.1. Responses by firms

Table A2 summarizes the main features of the dataset. Of the 249 firms we sent applications to, 233 are part of our main dataset in which we consider consistent responses by firms and treat missing values as rejections if and only if none of the applicants received an actual notification of a rejection by the firm. Thus, we exclude firms that did not respond to one of the applicants and rejected another. To check for the robustness of our findings, we also comment on the results with alternative treatments of missing responses.[18]

The proportions of all applicants who passed the first step of the hiring procedure and were invited to the test are indicated in the lower panel of Table A2. The invitation rates vary between 28.9% and 58.3%, depending on the wave and the treatment of non-responses by firms. When we test for significance of the differences in invitation rates between the sample consisting of the firms with consistent responses and the sample of all firms, we do not find statistically significant differences for each wave separately, nor for both waves together.[19]

There was an overlap of 43 firms in waves 1 and 2. We employed profiles with different individual characteristics of the three applicants between the waves

17. We used postal addresses in the relevant district of Berlin by adding nameplates to the mailboxes of collaborators who informed us of any incoming mail.
18. In particular, we investigate the data based on all responses, treating non-responses as missings, as well as the dataset where firms gave a complete response to all three applicants. All tables for these alternative ways to treat missing responses are reported in Appendix A5.
19. We also checked which firms gave consistent feedback. It turns out that firms that provide consistent feedback are, on average, smaller than firms in the full sample.

(name, address, photograph, CV, cover letter, school certificates). We have no indication that receiving applications from us twice but with different profiles created any suspicion on the part of the firms.

Importantly, our choice of names, addresses, photographs, etc., for the three fictitious applicants in each wave was successful in that the employers considered them to be roughly similar. In particular, we do not find any significant differences between the likelihood of the three fictitious applicants receiving an invitation in each of the two waves (see Appendix A1). This allows us to detect an effect of the applicant type (*New*, Old_{prevoc}, *Old*), since it is not dominated by differences in the relative attractiveness of the fictitious applicants. Such differences could entail that one of the applicant types is always invited while the other two never receive interview offers.

5.2. Experimental results

Our main result concerns the invitation rates of the three applicant types, displayed in Figure A1. It emerges that while the differences between applicants are not large, in both waves the percentages of applicants who received an invitation are ordered in the same way: Old applicants with prevocational training (Old_{prevoc}) are most likely to receive an invitation, followed by new applicants (*New*) who in turn are more likely to receive an invitation than old applicants without the training (*Old*). Note that the set-up of the experiments was the same in both waves aside from the average grades that are worse in the second wave (average grade of 2.8 in wave 1 vs. 3.2 in wave 2).

Table A3 contains the *p*-values of the McNemar test for the difference between the average invitation rates of the treatments.[20] The difference between Old_{prevoc} and *Old* is not significant in wave 1 but is significant at the 1% level in wave 2 as well as in both waves together. Comparing the two old applicants, participation in a prevocational training increases the invitation rate by 10% from 0.56 to 0.61 in wave 1 and by about 38% from 0.26 to 0.36 in wave 2. Note that the difference between Old_{prevoc} and *New* is not statistically significant in both waves when they are considered separately or together. The difference is larger in wave 2 than in wave 1. Both findings suggest that prevocational training helps school leavers with relatively poor grades more than those with good grades. Finally, the difference between *New* and *Old* is not significant.[21]

We also present the results of OLS models to assess the effect of the applicant type on the invitation rate in Table A4. For these regressions, we pool the data from both waves and introduce a dummy for wave 2 that is set equal to 0 for wave 1. Old_{prevoc} is the base category.[22]

20. The McNemar test is a non-parametric test for paired proportions assessing whether a statistically significant change in proportions has occurred on a dichotomous trait. It uses the chi-square test statistic. In our sample, the differences between the invitation rates of the applicant types are due to those firms that treat them differently.
21. Strictly speaking, non-parametric tests are not applicable for both waves together due to the overlap of 43 firms in wave 1 and 2. McNemar tests applied to the data of both waves but excluding overlapping firms in wave 2 [wave 1] yield similar results with $p = 0.002$ [$p = 0.004$] for the comparison of Old_{prevoc} and *Old*, and no significant differences for the comparison of Old_{prevoc} and *New*, and *Old* and *New*.
22. We report the results from a probit regression in the appendix. They are very similar.

The regressions corroborate the results from the non-parametric tests. Over both waves, *Old* applicants have a significantly lower chance of being invited compared to applicants of the base category Old_{prevoc} (columns 1 and 2). There is no statistically significant difference between *New* applicants and Old_{prevoc} applicants. Considering each wave separately (column 3) yields an insignificant difference between Old_{prevoc} and *Old* applicants in wave 1 ($p = 0.158$) but a significant difference in wave 2 ($p = 0.002$).[23] Thus, the findings based on non-parametric tests are confirmed. Finally, we find a significantly negative and large effect of the grade as indicated by the coefficient of I_{wave2} in column 2.

If we estimate the model using the dataset with complete responses by firms only and pooling both waves, *New* and *Old* applicants have a significantly lower probability of being invited than applicants of the base category Old_{prevoc}.[24] Considering each wave separately yields a significant difference between Old_{prevoc} and *Old* applicants for both waves, and a marginally significant difference between Old_{prevoc} and *New* in wave 2. Regressions based on all responses – including firms with inconsistent feedback – yield a significant difference between Old_{prevoc} and *Old* applicants and a marginally significant difference between Old_{prevoc} and *New* applicants. If we consider each wave separately for this dataset, the results also indicate a significant difference between Old_{prevoc} and *Old* applicants for both waves. The difference between Old_{prevoc} and *New* applicants is, however, not significant for either wave if considered separately.

Hence, across all datasets and waves, there is weak evidence that Old_{prevoc} applicants are more likely to be invited to an interview than *New* applicants. Moreover, no matter how we define the dataset, we find a robust difference between old applicants who participated in the training program and old applicants who did not. Thus, the training makes older applicants significantly more likely to be invited.

5.3. Heterogeneity

In this section, we focus on the question of whether the observed differences in invitation rates vary with certain characteristics of the firm or the application format. We collected three variables describing the firms that we sent applications to and the application format, summarized in Table A5. These variables include the size and private or state ownership of the firm as well as how the application was submitted (email, mail or online).[25] The size of the firm may affect the professionalization of its hiring practices while private or state ownership can make a

23. The *p*-values in wave 2 are obtained by Wald tests of the sum of the coefficients on the dummy of the applicant type and the corresponding interaction with wave 2 against zero.
24. The regression results are reported in Appendix A2.
25. When we categorize the firms in our sample into different industry classes ('Agriculture, Forestry, Mining', 'Manufacturing', 'Construction', 'Trade & Repair', 'Business Services', 'Other Services', 'Medical & Nursing Services' and 'Public Service & Education'), we find that service providers drive the positive effect of the voluntary training program on invitation rates for older applicants. In contrast, the difference between fresh school leavers and applicants who have been out of school for two years and work in informal jobs but did not participate in the training is insignificant for all categories. Note, however, that due to sample size restrictions this heterogeneity analysis is only meaningful for a subset of these classes.

difference with respect to the overall objectives of the firm. Finally, the format that is required for the application may be correlated with the hiring practices of the firm.

For 222 of the 233 firms, we were able to obtain information about their size measured by the number of employees. The mean number of employees is 2,832. The firm size distribution is highly skewed, and the median number of employers is 250. The number of employees spans a wide range, from 9 to 56,000. We classify firms into three categories: small firms that have fewer than 50 employees (11.59% of firms), intermediate firms that have between 51 and 500 employees (45.06%) and large firms with more than 500 employees (38.63%). Furthermore, we are able to differentiate between privately owned firms and firms in state ownership. The large majority of firms in our sample (84.98%) are in private ownership. About 15% are owned by the state or local public authorities. In addition, we can differentiate whether the application was sent via e-mail, via mail or created online. The large majority of applications (74.68%) were sent via e-mail. The remaining applications are split almost equally between mail (13.73%) and online applications (11.59%).

To analyze how the effect of participating in prevocational training varies with these characteristics of the firm and the application format, we pool the data from both waves and regress the invitation decision on a dummy for new applicants, old applicants, one of the moderators, the interaction of the dummy for old applicants and the moderator, and a dummy for wave. We first consider the comparison of old applicants with and without training, and then turn to the results regarding fresh school leavers.

Regarding the role of firm size, we observe that the negative effect for old applicants of not participating in the training is marginally significant for small firms and significant at the 1% level for firms of intermediate size. The effect is statistically insignificant for large firms and for the 33 observations for which we lack the firm size information. Thus, the positive effect of the training seems to apply in particular for firms of small and intermediate size.

With respect to firms in private or state ownership, we find for private firms that *Old* applicants have a 9.5 percentage points lower chance of being invited than Old_{prevoc} applicants, which is significant. In contrast, for state-owned firms the effect of the training is small and not significantly different from zero.

If we compare *Old* and Old_{prevoc} applicants for different application formats (e-mail, mail, online), we find a significant effect of the training for the largest group (e-mail). The positive effect of the training is even more pronounced for applications which were made by mail or online, amounting to 11.3 and 11.2 percentage points, respectively. However, due to the small number of firms in these two categories, the effect is significantly different from zero only at the 10% level.

Finally, we also investigate whether the insignificant difference between *New* and Old_{prevoc} applicants in Table A4 masks heterogeneous effects depending on firm characteristics or the application format. We find no statistically significant effect for any of the categories, with one exception: For state-owned firms, we observe a marginally significant and negative effect of being a *New* applicant compared to applying as an Old_{prevoc} applicant. Hence, state-owned firms seem to prefer fresh school leavers compared to older applicants.

The heterogeneity analysis yields two take-aways. First, prevocational training increases invitation rates of older applicants by small and intermediate firms. One reason for this finding could be that the participation in the training gets more attention in smaller firms because of less standardized hiring procedures. Second, the advantage of older applicants with prevocational training is driven by firms in private ownership.

6. DISCUSSION AND CONCLUSION

What matters in the first screening of young applicants by employers? Two main conclusions can be drawn from our findings. First, we observe that participation in a voluntary training program for youths without an apprenticeship has a significantly positive effect: Older applicants with one year of training are more attractive than older applicants without training. The participation in the voluntary training program can signal desirable traits such as diligence and self-discipline, but the training may also convey human capital that is valued by the employers.

Second, we find that the potential stigma attached to not starting an apprenticeship right after school is compensated by work experience and/or age. Fresh school leavers are not more likely to receive an invitation compared to applicants who have been out of school for two years and who are working in informal jobs. Thus, at this early stage of life not starting an apprenticeship right after school does not have a strong negative effect – at least not strong enough to dominate the potentially positive effect of age and some work experience in an informal job. In fact, it could be either the higher age, the work experience in an informal job or the combination of both that causes applicants who have been out of school for some time to be as attractive to employers as fresh school leavers. The employers' attitude toward fresh school leavers may also partly be driven by the fact that their final grade is still uncertain when they apply for the position.

Overall, we do not observe a negative effect of taking up a lower level interim job, in contrast to Nunley *et al.* (2017) and Farber *et al.* (2015). Our result, that older applicants who are working in an informal job do not fare worse than fresh school leavers, also differs from findings regarding the effects of unemployment later in life where negative duration effects are documented for Sweden after nine months (Eriksson and Rooth, 2014) or even within the first eight months (Kroft *et al.*, 2013) in the US. While it seems possible that the effect of under- and unemployment spells is non-monotone over the working life, a systematic study of this question is still missing.

The result of no disadvantage for older applicants does not contradict studies that find scarring effects of early unemployment. Rather, we are able to demonstrate that negative effects of not having started an apprenticeship for two years after school on the probability of being invited to an interview are not caused by the employers. This does not preclude negative effects after longer spells of no formal employment or at later stages of the recruitment process, nor adverse effects on the behavior of applicants, for example, due to the demoralizing

experience of not finding an apprenticeship. Also, applicants who start an apprenticeship later have less work experience, which could lead to lower future earnings.

Our findings suggest that the voluntary participation in a prevocational training measure improves the employment chances of older applicants. A natural question is why the rate of students taking up an apprenticeship after the prevocational training is rather low at the national level (around 40%, see Baethge *et al.*, 2007). First, note that in Berlin (but not in some other German states) such training is voluntary, thereby allowing applicants to signal positive characteristics such as self-discipline and motivation. In other states where the training is mandatory, its signaling value may be lower. Moreover, note that the content and extent of prevocational training measures vary between German states. Hence, generalizations to other states should be treated with caution. Second, our experimental set-up excludes the possibility that old and new applicants differ with respect to the written applications, test-taking skills, search behavior and skills in job interviews. Thus, fostering such competencies in older applicants may improve their chances of getting an apprenticeship.

The field experiment was conducted with female applicants. Therefore, the effect of spells of no formal employment of young men remains an open question. Note, however, that Kroft *et al.* (2013) report similar duration dependence estimates for men and women. Moreover, reanalyzing the data of Eriksson and Rooth (2014) we find that their main results hold for men and women.[26]

The field experiment focused on two occupations that are among the most frequently chosen apprenticeships: office manager and office clerk. Employers typically ask for an intermediate secondary degree, and the occupations are relatively demanding. It is unclear whether the positive effect of participating in the training program would be more or less pronounced for occupations that require lower competence levels. On the one hand, for such occupations the training received by completing the program may be less relevant. On the other hand, the average quality of applicants for these jobs might be lower and, in turn, the signaling effect of participating in the training program might be more pronounced.

The study highlights the importance of an experimental approach to identify the determinants of success and failure of labor market entrants, since a causal relationship between the occupation after leaving school and the employer's response can be established. Overall, the results suggest that giving youths without formal employment the possibility to acquire more human capital and to send positive signals about themselves can provide them with time to grow and to postpone a definite choice for a profession. This seems especially valuable given the high rate of premature terminations of apprenticeship contracts (20–25% of all contracts over the past decade, see BIBB, 2014).

26. Our re-estimations of the data of Eriksson and Rooth (2014) separately for men and women yield no duration dependence for women and men separately for the entire sample, nor for high-skill jobs. This coincides with the findings by Eriksson and Rooth (2014) for the full sample of men and women. Analyzing medium- and low-skill jobs, the coefficient on unemployment of nine months remains similar in size for each gender separately (below −0.03) though it is significant only for male applicants.

APPENDIX

A.1. Tables

Table A1 Three types of applicants in waves 1 [& 2]

New applicant	Old_{prevoc} applicant	*Old* applicant
10th grade student, very likely to receive an intermediate secondary degree in summer 2012 [2013]	Received an intermediate secondary degree in 2010 [2011]	Received an intermediate secondary degree in 2010 [2011]
	Followed a one-year prevocational program	
	Currently has a temporary informal job	Currently has a temporary informal job

Table A2 Main properties of the dataset

	Wave 1 (avg. grade 2.8)	Wave 2 (avg. grade 3.2)	Wave 1 + 2
No. of firms applied to (no. of applications)	115 (345)	134 (402)	249 (747)
No. of firms with consistent feedback [proportion]	111 [96.5%]	122 [91.1%]	233 [93.6%]
No. of invitations (all applications) [proportion]	194 [56.2%]	116 [28.9%]	310 [41.5%]
No. of invitations (consistent feedback) [proportion]	194 [58.3%]	115 [31.4%]	309 [44.2%]

Table A3 Results of McNemar tests

			Wave 1	Wave 2	Wave 1 + 2
Old_{prevoc}	vs.	Old	0.157	0.003	0.002
New	vs.	Old_{prevoc}	0.414	0.317	0.199
New	vs.	Old	0.655	0.144	0.170
N			111	122	233

Table A4 OLS regression for invitations of applicants

	(1)	(2)	(3)
I_{New}	−0.039	−0.039	−0.036
	(0.031)	(0.031)	(0.044)
I_{Old}	−0.077***	−0.077***	−0.054
	(0.025)	(0.025)	(0.038)
I_{wave2}		−0.268***	−0.252***
		(0.049)	(0.058)
$I_{New} \times I_{wave2}$			−0.005
			(0.059)
$I_{Old} \times I_{wave2}$			−0.044
			(0.050)
Constant	0.481***	0.621***	0.613***
	(0.035)	(0.044)	(0.047)
N	699	699	699

Notes: Regressions based on consistent responses by firms where missing values are treated as rejections if and only if none of the applicants received a rejection (pooled data of waves 1 and 2). Values in parentheses represent standard errors corrected for clusters at the firm level. Asterisks represent *p*-values: *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$

Table A5 Heterogeneity analysis

Firm size	Small	Mid	Large	NoInfo
Proportion	11.59%	45.06%	38.63%	4.72%
β_{Old}	−0.112*	−0.086***	−0.058	−0.065
β_{New}	−0.020	−0.034	−0.044	−0.084
Firm type		Private		State
Proportion		84.98%		15.02%
β_{Old}		−0.095***		0.024
β_{New}		−0.031		−0.082*
Application format	E-mail		Mail	Online
Proportion	74.68%		13.73%	11.59%
β_{Old}	−0.065**		−0.113*	−0.112*
β_{New}	−0.050		0.008	−0.020

Notes: Analysis based on 699 observations, that is, 233 firms providing consistent responses. The row 'proportion' yields the proportion of observations (firms) per category. β_{Old} and β_{New} show the effect of applying as an old applicant with prevocational training and as a new applicant on the invitation rate per category. Firms are counted for every wave. There was an overlap of 43 firms in waves 1 and 2. *, ** and *** indicate significance at the 10%, 5% and 1% level.

A.2. Figure

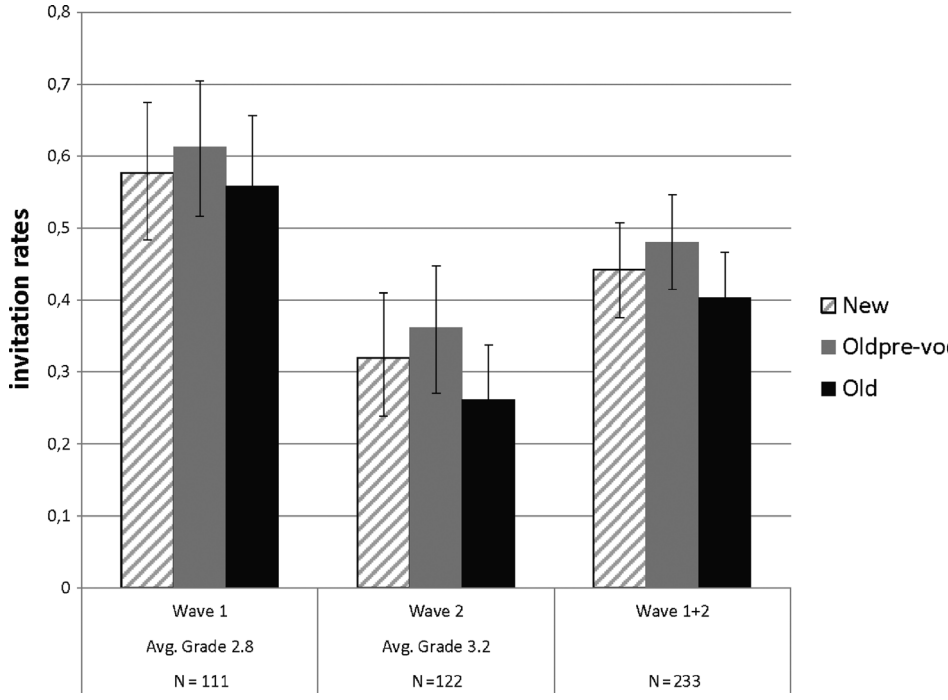

Figure A1 Invitation rates of the three applicant types
Notes: The figure is based on all consistent responses by firms where missing values are treated as rejections if none of the applicants received a rejection. Confidence intervals are 95% binomial confidence intervals.

A.3. Fictitious applicant profiles

We created six fictitious applicant profiles, three for wave 1 and three for wave 2. Each of the six application packages contained a cover letter and CV, which differed slightly in style and layout. We chose six common female first names in the birth cohorts of 1993–96 and combined them with six frequent last names resulting in Anna Schmidt (profile 1), Laura Krüger (profile 2) and Carolin Lehmann (profile 3) in wave 1, Alina Hoffmann (profile 1), Jana Schröder (profile 2) and Sara Weber (profile 3) in wave 2. All applicants have similar family backgrounds, hobbies, attend(ed) similar schools, live in the same large district of Berlin, and are similarly attractive according to their photographs. For the new applicants, we submitted the two school reports from grade 9, and the final grade 8 report (for early applications before February) or the mid-year report of grade 10 (for late applications). For old applicants, we submitted the two school reports from grade 10 as well as the final report from grade 9. Figure A2 contains the sample of an actual application. We edited out part of the application photo for privacy reasons, but it is available upon request.

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29. Dezember 2011

Bewerbung um einen Ausbildungsplatz zur Bürokauffrau

Sehr geehrte Damen und Herren,

ich bin im Internet auf Ihr Unternehmen gestoßen und möchte mich um einen Ausbildungsplatz als Bürokauffrau bei Ihnen bewerben. Ich habe mich in den vergangenen Monaten gründlich mit verschiedenen Berufen auseinandergesetzt und festgestellt, dass der Beruf Bürokauffrau mit seiner Aufgabenvielfalt mich sehr begeistert.

Nach meinem Mittleren Schulabschluss an der Wolfgang-Borchert-Oberschule 2010 habe ich ein Jahr lang die kaufmännische Berufsfachschule am OSZ Recht besucht. Seitdem arbeite ich im Verkauf in einem Gemüseladen. In der Berufsfachschule habe ich meine PC-Kenntnisse erweitern können und habe gelernt wie z.B. Anschreiben oder Angebote in Word erstellt werden oder Tabellen in Excel zu bearbeiten sind. Außerdem konnte ich meine kommunikativen Fähigkeiten und meine Kenntnisse in Mathematik und Englisch verbessern.Das Erlernte würde ich sehr gerne bei einer Ausbildung in Ihrem Unternehmen zum Einsatz bringen.

Ich erledige Aufgaben selbstständig, aber auch im Team effizient und bringe eine hohe Motivation für anspruchsvolle Tätigkeiten mit.

Ich hoffe meine Bewerbungsunterlagen haben Ihr Interesse geweckt. Über eine Einladung zu einem Vorstellungsgespräch würde ich mich ganz besonders freuen.

Mit freundlichen Grüßen

Anna Schmidt

Figure A2 Sample of an application [Colour figure can be viewed at wileyonlinelibrary.com]

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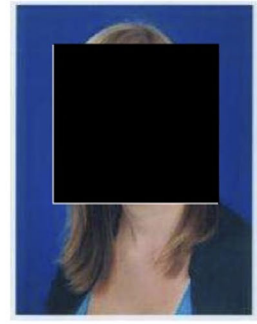
LEBENSLAUF



Geboren am	7. November 1993 in Berlin
	Deutsche Staatsangehörigkeit
Familienstand	ledig
Vater	T. Schmidt - Elektroinstallateur
Mutter	C. Schmidt - Krankenpflegerin
Geschwister	Jonas Schmidt (14 Jahre)

• Schulbildung

2000 –2006	Siegerland- Grundschule
2006 –2010	Wolfgang-Borchert-Oberschule (Berlin - Spandau)
2010	Mittlerer Schulabschluss
2010 bis 2011	Einjährige kaufmännische Berufsfachschule am OSZ Recht in Berlin

• Arbeitserfahrung

	Dreiwöchiges Schulpraktikum in einer Apotheke
Ab Sommer 2011	Verkäuferin in einem Gemüseladen

• Kenntnisse und Interessen

Sprachen	Englisch und Französisch
PC-Kenntnisse	Internetanwendungen, Word, Excel, Power Point
Hobbys	Fotografieren, Volleyball, Freunde treffen

Berlin, 29. Dezember 2011,

Anna Schmidt

Table A6 provides statistical evidence that our three fictitious applicants per wave were similarly attractive to the employers. Note that each of the fictitious profiles was randomly matched to one of the three applicant types (*New*, Old_{prevoc}, *Old*) for every application. The invitation rates for fictitious applicants 1, 2 and 3 are almost identical in wave 1. In wave 2, the invitation rate for fictitious applicant 2 is a bit lower than for fictitious applicant 1 and 2. However,

Table A6 Invitation rates by fictitious applicant profile and wave

Fictitious profile		Wave 1	Wave 2
1	Mean	0.586	0.344
	[SEM]	[0.047]	[0.043]
	n	111	121
2	Mean	0.550	0.270
	[SEM]	[0.047]	[0.040]
	n	111	121
3	Mean	0.613	0.328
	[SEM]	[0.046]	[0.043]
	n	111	121
McNemar test (*p*-values)			
1 vs. 2		0.371	0.072
1 vs. 3		0.491	0.670
2 vs. 3		0.144	0.090

Note: Numbers are based on the sample of firms with consistent responses. Values in square brackets represent standard errors of the mean [SEM].

the differences are not large and all fictitious applicant types receive a sizeable number of both invitations and rejections.

A.4. Probit

In this section, we document the results that we obtain when we use probit models instead of OLS (see Table A7).

Table A7 Probit regression for invitations of applicants

	(1)	(2)	(3)
I_{New}	−0.038	−0.038	−0.034
	(0.030)	(0.030)	(0.042)
I_{Old}	−0.077***	−0.078***	−0.051
	(0.024)	(0.024)	(0.036)
I_{wave2}		−0.258***	−0.238***
		(0.043)	(0.052)
$I_{New} \times I_{wave2}$			−0.007
			(0.058)
$I_{Old} \times I_{wave2}$			−0.052
			(0.049)
N	699	699	699
logL	−478.40	−452.53	−452.32
$\chi^2_{(k-1)}$	9.87	37.80	38.84

Notes: Regressions based on consistent responses by firms, where missing values are treated as rejections if none of the applicants received a rejection (pooled data of waves 1 and 2). We report marginal effects. Values in parentheses represent standard errors corrected for clusters at the firm level. Asterisks represent *p*-values: *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

A.5. Alternative treatments of missing values

In this section, we document the main results depending on the treatment of non-responses by firms. In Table A8, we consider only responses by firms that provided complete feedback.

In Table A9, we include all observations, and non-responses of firms are treated as missing values.

Table A8 Probit regression for invitations of applicants

	(1)	(2)	(3)
I_{New}	−0.065**	−0.065**	−0.046
	(0.031)	(0.031)	(0.043)
I_{Old}	−0.087***	−0.087***	−0.078**
	(0.026)	(0.026)	(0.040)
I_{wave2}		−0.280***	−0.262***
		(0.048)	(0.052)
$I_{New} \times I_{wave2}$			−0.037
			(0.063)
$I_{Old} \times I_{wave2}$			−0.015
			(0.052)
N	552	552	552
$logL$	−381.05	−356.84	−356.76
$\chi^2_{(k-1)}$	11.24	33.98	34.37

Notes: Regressions based on responses where firms provided complete feedback (pooled data of waves 1 and 2). We report marginal effects. Values in parentheses represent standard errors corrected for clusters at the firm level. Asterisks represent p-values: *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

Table A9 Probit regression for invitations of applicants

	(1)	(2)	(3)
I_{New}	−0.051*	−0.052*	−0.049
	(0.031)	(0.030)	(0.043)
I_{Old}	−0.083***	−0.089***	−0.076**
	(0.026)	(0.025)	(0.038)
I_{Wave2}		−0.285***	−0.276***
		(0.045)	(0.055)
$I_{New} \times I_{Wave2}$			−0.004
			(0.060)
$I_{Old} \times I_{Wave2}$			−0.025
			(0.052)
N	615	615	615
$logL$	−424.83	−396.70	−396.66
$\chi^2_{(k-1)}$	10.26	39.57	39.87

Notes: Regressions based on all observations, and non-responses are treated as missing values (pooled date of waves 1 and 2). We report marginal effects. Values in parentheses represent standard errors corrected for clusters at the firm level. Asterisks represent p-values: *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

ACKNOWLEDGEMENTS

We would like to thank David Danz for his great support, Bernd Fitzenberger for very helpful comments as well as Heike Solga and Paula Protsch for many fruitful discussions and interdisciplinary cooperation. We are also grateful to Michaela Zwiebel, Sajoscha Engelhardt, Manuela Ludwig and Jennifer Rontganger for their assistance. The paper has benefited from discussions with seminar audiences at Humboldt University Berlin, the Workshop 'Employers as Gatekeepers' at WZB Berlin 2014 and at the Economic Science Association (ESA) Meeting 2015 in Heidelberg.

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